

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Math 10F&PC Chapter 2 Trigonometry

### 2.7 Solving Problems Involving More than One Right Triangle

We can use trigonometry to solve problems that can be modeled using right triangles. When more than one right triangle is involved, we have to decide which triangle to start with.

**Example 1:** Calculate the length of **CD** to the nearest tenth of a centimetre.

1) Solve For BD in  $\triangle ABD$

opp = 4.2

$\angle B = 47^\circ$   
BD = hyp

$$\sin \angle B = \frac{\text{opp}}{\text{hyp}}$$

$$\sin 47^\circ = \frac{4.2}{BD}$$

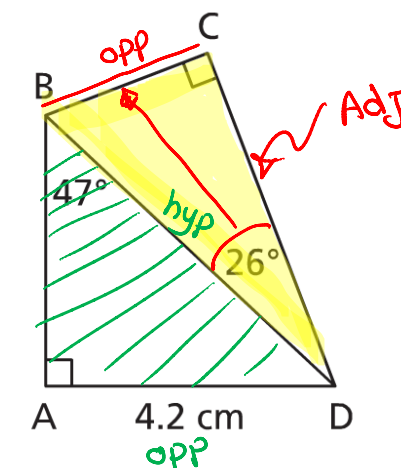
$$BD \frac{(\sin 47^\circ)}{\sin 47} = \frac{4.2}{\sin 47} = \underline{\underline{5.74}}$$

2) Solve For BC in  $\triangle BCD$

CD = Adj  
hyp = 5.74  
 $\angle D = 26^\circ$

$$\cos 26^\circ = \frac{CD}{5.74}$$

$$BC = (5.74) \cos 26^\circ = 5.16$$



$$\approx \underline{\underline{5.2 \text{ cm}}}$$

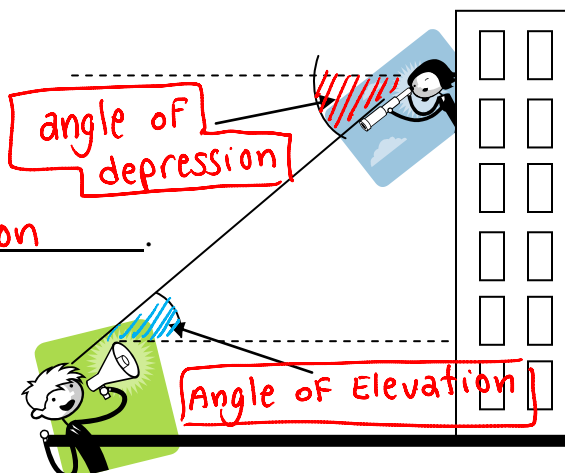
If Romeo stands outside a building and

looks at Juliet in an upstairs window, the angle that Romeo's line of sight makes **with the horizontal** is known as the

angle of depression Angle of depression.

If Juliet is standing at the window and looking down at Romeo, the angle that Juliet's line of sight makes **with the horizontal** is known as the

Angle of Elevation.



**Example 2:** From the top of a 20m high building, a surveyor measured the angle of elevation of the top of another building and the angle of depression of the base of that building. The surveyor sketched this plan of her measurements. Determine the height of the taller building to the nearest tenth of a metre.

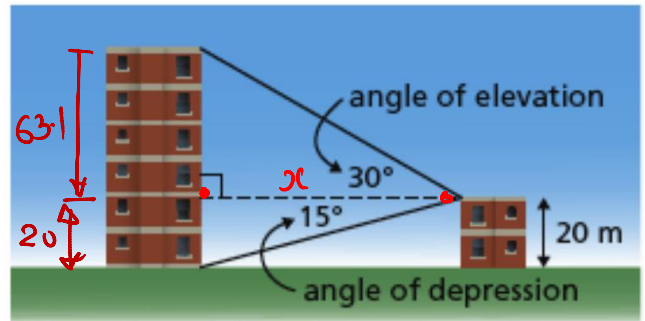
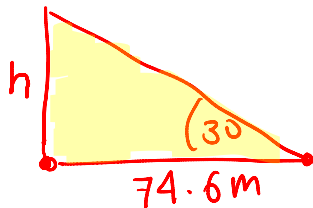
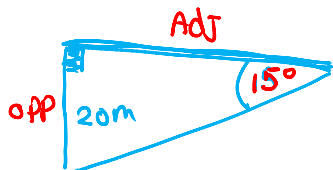
$$\text{① } \tan 15^\circ = \frac{20}{x}$$

$$x = \frac{20}{\tan 15} = 74.6 \text{ m}$$

$$\text{② } \tan 30^\circ = \frac{h}{74.6}$$

$$h = 74.6 (\tan 30)$$

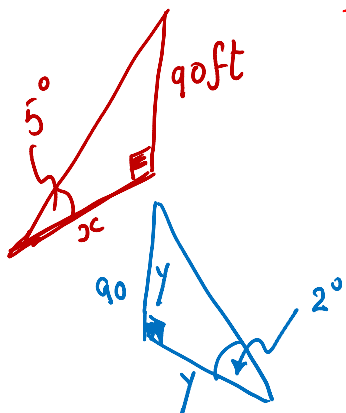
$$h = 63.1 \text{ m}$$



The total(h) For the taller building  
 $= 20 \text{ m} + 63.1 \text{ m}$   
 $= 83.1 \text{ m}$

**Example 3:** From the top of a 90ft. observation Tower, a fire ranger observes one fire due West of the tower at an angle of depression Of  $5^\circ$ , and another fire due south of the tower At an angle of depression of  $2^\circ$ . How far Apart are the fires to the nearest foot?

This diagram is not drawn to scale.



$$\tan 5^\circ = \frac{90}{x}$$

$$x = \frac{90}{\tan 5^\circ} = 1028.7 \text{ ft}$$

$$\tan 2^\circ = \frac{90}{y}$$

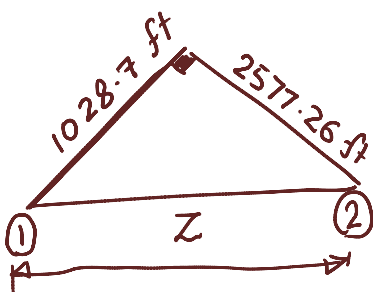
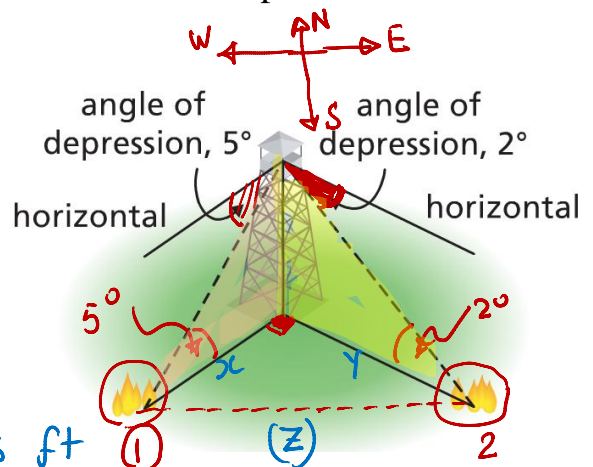
$$y = \frac{90}{\tan 2^\circ} = 2577.26 \text{ ft}$$

$$c^2 = a^2 + b^2$$

$$Z^2 = x^2 + y^2$$

$$Z = \sqrt{(1028.7)^2 + (2577.26)^2}$$

$$Z = 2774.97 \approx 2775 \text{ ft}$$



***Assignment: Page 118 Q#4–6, 8, 10, 12, 14***